

Sociological strategies to allay unfounded perceptions of risk and encourage public/private support for microbial biocontrol projects

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Realizing the potential benefits that microorganisms could provide society hinges, in part, on scientists understanding how society at large perceives risk. Scientific understanding of microbiology has expanded remarkably, but so too has public suspicion of scientists and (public and private) institutions that use science. Billions of dollars have been spent to create, assess and communicate technical information about the risks of technologies, yet social science surveys have consistently shown that the public has become more, not less, concerned about the risks of modern life (Slovic, 1987, Slovic, 2001). Thus, there is a significant gap between scientific and public perception of risks. Overcoming this gap cannot be done by knowledge alone, but also by fostering trust. Although scientific institutions are not organized to cultivate public trust, this is essential to realizing the potential benefits of microorganisms.

Informed by critical social science, the following is a fundamental strategy to overcome this gap in risk perception:

1. Encourage transparent regulatory decision making criteria and processes
2. that foster meaningful public participation
3. by constructing public trust
4. with public engagement processes
5. that link trustworthy messengers,
6. and appropriate messages

This short paper provides background on how to pursue this strategy.

Recent research in cognitive psychology and neuroscience has demonstrated two fundamental different ways in which human beings conceptualize risk (Slovic et al., 2004). The “analytic” system uses formal logic, probabilistic reasoning, and scientific deliberation. The “experiential” system is intuitive, largely automatic response to perceived danger, and often inaccessible to subjective awareness. The experiential system resulted from human evolutionary processes that selected against those who failed to perceive environmental risks (e.g., larger predators, foul water), and may be considered the default approach to human risk perception (Slovic et al., 2004). This second “system” of risk perception is instinctual to human beings, and scientific training develops the skills and disposition to deploy the analytic system in its place. Social science research has consistently found that the public has a broader conceptualization of risk than experts, consistent with their perspective of the world. This public perception of risk is both qualitative and complex (Slovic, 2001).

Perverse outcomes occur when the analytic risk assessment paradigm is used to communicate with audiences who can only use experiential risk perception paradigm. Most scientists are trained to use the risk assessment paradigm, and thus must develop additional skills. To effectively communicate across this risk perception gap:

1. Public messages should always establish the problem definition first (as the premises for any proposed introduction).
2. Consistently explain why a novel introduction is justified (economics).
3. Use pharmaceutical or medical analogies, not militaristic metaphors (never use “phytopathogen” in public). Create intentional partnerships with trustworthy messengers (e.g., stakeholders)
4. Decision-making process improved by a different form of external scientific peer review (not perceived insiders) guided by clear criteria accessible to public.

This will require public engagement processes construct public trust and foster meaningful public participation. Science communication scholars have advanced an alternative model, that of “participatory public engagement. This approach facilitates participation and mutual learning among members of the public, scientists, and stakeholders with respect to the development and application of science and technology in modern society. Participatory public engagement is designed to facilitate the expression of reasonable concerns from responsible citizens to scientists and regulatory officials with the intent of increasing the quality of deliberative decision making. Thus, it rests on the fundamental social value of democratic participation. Another term for this is participatory technology assessment (pTA), and recent scholarship in this area has outlined specific strategic options for creating such a process in the U.S. (Sclove, 2010).

Typical NEPA practice is not sufficient to address contemporary public risk perception; it generally fails to foster meaningful participation because it does not address the issue of public trust. The need for fresh initiatives in this area is great, because new media is changing the American public. They are accustomed to “instant knowledge” through the internet, ideologically biased news sources, and social media. Public fear and mistrust are at record highs, and fear-inducing messages are more compelling to the public than scientific knowledge. New efforts that go beyond NEPA public consultation requirements will be required. The best example of a trust-building public engagement process in biological control policy is in New Zealand.

The Environmental Risk Management Authority of New Zealand regulates the introduction of biological control agents requires the most sophisticated, democratic decision making process yet developed for evaluating novel organism introductions. It lays out clear decision-making criteria based on transparent and replicable ecologically-based risk-cost-benefit analysis, with date certain decisions. It requires participatory public engagement (ERMA New Zealand, 2010). The ERMA process is the most scientifically rigorous but also the most democratic approach to biocontrol agent regulatory evaluation in the world today. This process has prompted some optimism that risks associated with biological control introductions can be better identified, managed and regulated (Barratt et al., 2010). ERMA provides a template which can inform regulatory reform to facilitate appropriate biocontrol regulation in the U.S. or elsewhere.

Participatory public engagement should be designed to facilitate the deliberation of responsible citizens with reasonable concerns about what constitutes “social benefit.”

It should attempt to filter out the expression of alarmist fears and ideologically-driven obstructionism. Social benefit cannot be effectively defined exclusively by scientists and government officials. Bringing democratic values to bear on public deliberation of the risks of novel organisms or technologies requires scientifically-informed deliberation by citizens about potential risks and benefits.

Transparent regulatory decision making criteria and processes, should, in theory increase the responsiveness of citizens, improve the quality of public agency communication, and result in “better” environmental decisions. Better means: an appropriate degree of public participation, more public support for public environmental protection, and a practical articulation of science and democracy in policy. This depends upon recruiting appropriate responsible participants, the participants having accurate knowledge and clear sense of the social values underlying decisions, clear decision making criteria, and facilitated deliberation and consensus building.

It is inevitable that the values and culture will shape public perceptions of the risks of microorganisms, but it is not inevitable that the debate become polarized or negative. New, participatory forms of public engagement, such as participatory technology assessment, can help overcome the gaps in assumptions and knowledge of risks and benefits. These have the ability to improve the quality of public communication, but also to enhance the democratic deliberation on the relative risks and benefits of microbiological applications. Effective public communication across gaps in understandings of risk can foster shared understandings of scientific knowledge, risks and benefits, social values and democratic decision making. Realizing the potential of microorganisms to provide benefits to society is contingent, in part, on scientists engaging and transforming public perceptions of risk.

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